Abstract

Roll dynamic response is investigated and studied to improve the dynamic behavior of road vehicle during sudden maneuver according to step steer input using semi-active PID suspension. A Mathematical model including the differential governing equations of operation for full road vehicle with (9) degrees of freedom and passive PID suspension is presented. Car body movements and displacements are investigated using Computer-aided simulation with Matlab Program for different vehicle speeds and specified step steer angles. A special technique is used to transform the second order differential equations of operation for the road vehicle into first order equations in order to reduce the computational time. Simulation results shows the dynamic responses of road vehicle at vertical, pitch and roll motions subjected to different vehicle speeds and step steer angles utilizing settling time and maximum peak overshoot, also the results show an improvement in dynamic roll response using semi-active PID suspension with conical shaped spring.

References
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Index Terms

Computer Science
Automated Systems

Keywords

Roll dynamic response, Semi active suspension, PID controller, road vehicle